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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,152	12/04/2001	Yoram Nelken	PA2325	3645

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OIPE JC64
OCT 17 2003
PATENT & TRADEMARK OFFICE

EXAMINER
DAVIS, GEORGE B

ART UNIT	PAPER NUMBER
2121	13

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/008,152
Filing Date	December 4, 2001
First Named Inventor	Yoram Nelken
Art Unit	2121
Examiner Name	George B. Davis
Attorney Docket Number	PA2325

Total Number of Pages in This Submission: 16

ENCLOSURES *(Check all that apply)*

- [ ] Fee Transmittal Form
- [ ] Fee Attached
- [x] Amendment/Reply
- [ ] After Final
- [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
- [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
- [ ] After Allowance communication to Group
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to Group **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below): Postcard

Remarks: Total page number does not include postcard and check(s), if applicable.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Carr & Ferrell LLP
Signature	Wendi R Schepler — Reg. No. 43,091
Date	June 9, 2003

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OIPE JC64 OCT 17 2003 PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	Yoram Nelken
SERIAL NO.:	10/008,152
FILING DATE:	December 4, 2001
TITLE:	System and Method for Automatic Task Prioritization
EXAMINER:	George B. Davis
ART UNIT:	2121
CONFIRM. NO.:	3645
ATTY. DKT. NO.:	PA2325

CERTIFICATE OF MAILING

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Date: 6-9-2003 Wendi R Schepler

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RESPONSE TO OFFICE ACTION

In response to the Office Action mailed March 13, 2003, please consider the following remarks:

OIPE
OCT 17 2003
PATENT & TRADEMARK OFFICE

Office Action Summary

Application No.	Applicant(s)
10/008152	Yoram Nelken
Examiner	**Group Art Unit**
George Davis	2121

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE Three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication .
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

☒ Responsive to communication(s) filed on 6/11/03.

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disp sition of Claims

☒ Claim(s) 1-49 and 51-67 is/are pending in the application.

Of the above claim(s)_____ is/are withdrawn from consideration.

☐ Claim(s)_____ is/are allowed.

☒ Claim(s) 1-49 and 51-67 is/are rejected.

☐ Claim(s)_____ is/are objected to.

☐ Claim(s)_____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on_____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on_____ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number)_____.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received:_____.

Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s)._____

☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other_____

Office Action Summary

DETAILED ACTION

Claim Rejections - 35 U.S.C. § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-49 and 51-67 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Erman et, U.S. Pat. No. 4658370.

As per claim 1, Erman discloses a contact center configured to receive said communications (abstract and figures 1 and 2), a decision engine configured to determine a priority code for each of said received communications (abstract and figures 1 and 2) and at least one queue configured to store said prioritized communications in order of priority code (abstract and figures 1 and 2).

AS per claim 18, Erman discloses a contact center configured to receive said tasks (abstract and figures 1 and 2), a decision engine configured to determine a priority code for each of said tasks (abstract and figures 1 and 2) and at least one queue configured to store said tasks in order of priority code (abstract and figures 1 and 2).

AS per claim 35, Erman discloses receiving said communications (abstract and figures 1 and 2), determining a priority code for each of said received communications (abstract and

figures 1 and 2) and storing said prioritized communications in at least one queue according to priority code (abstract and figures 1 and 2).

As per claims 2, 19 and 36, Erman discloses includes a parser configured to analyze content of said received communications/tasks (abstract and figures 1 and 2).

As per claim 3, 20 and 37, Erman discloses communications/tasks include text communications/tasks and said decision engine includes a parser configured to parse text of said text communications/tasks (abstract and figures 1 and 2).

As per claims 4, 21 and 38, Erman discloses text communications/tasks contain natural language that is parsed by said parser (abstract and figures 1 and 2).

As per claims 5, 22 and 39, Erman discloses identifies concepts of said received communications/tasks (abstract and figures 1 and 2).

As per claims 6 and 23, Erman discloses parser identifies relationships between said concepts (abstract and figures 1 and 2).

As per claim 7, 24 and 40, Erman discloses compares said concepts with priority criteria to determine said priority codes (abstract and figures 1 and 2).

As per claims 8, 25 and 41, Erman discloses received communications/tasks by identifying keywords in said received communications/tasks (abstract and figures 1 and 2).

AS per claims 9, 26 and 42, Erman discloses received by said contact center via a text-based communication/tasks channel (abstract and figures 1 and 2).

As per claim 10, 27 and 43, Erman discloses communications/tasks are voice communications/tasks and said decision engine includes a parser configured to analyze content of said voice communications/tasks (abstract and figures 1 and 2).

As per claims 11, 28 and 44, Erman discloses an agent having a judgment of priority selects prioritized communications from said queue according to said judgment of priority (abstract and figures 1 and 2).

As per claims 12, 29 and 45, Erman discloses a monitoring module configured to monitor communications selected by said agent and to provide said selected communications and priority codes of said selected communications as feedback to said decision engine (abstract and figures 1 and 2).

As per claims 13, 30 and 46, Erman discloses utilizes said feedback to adjust priority criteria used to determine priority of said received communications (abstract and figures 1 and 2).

As per claims 14 and 31, Erman discloses a parser configured to parse said received communications and a priority module configured to receive parsed communications from said parser and determine said priority code for each of said parsed communications (abstract and figures 1 and 2).

As per claims 15 and 32, Erman discloses priority module is a learning system and receives feedback from a monitoring module that monitors communications selected from said queue by at least one agent (abstract and figures 1 and 2).

As per claims 16 and 33, Erman discloses priority module is a rule-based system that determines said priority code according to a set of predetermined rules (abstract and figures 1 and 2).

AS per clams 17 and 34, Erman discloses priority code is determined in accordance with priority guidelines established by a user of said system (abstract and figures 1 and 2).

As per claim 47, Erman discloses converting said voice communications into text communications prior to determining said priority code (abstract and figures 1 and 2).

AS per claim 48, Erman discloses analyzing content of said voice communications includes identifying emotional content (abstract and figures 1 and 2).

As per claim 49, Erman discloses means for receiving said communications (abstract and figures 1 and 2), means for determining a priority code for each of said received communications (abstract and figures 1 and 2) and means for storing said prioritized communications in order of priority code (abstract and figures 1 and 2).

As per claims 51, 54, 57 and 60, Erman discloses the decision engine is capable of learning new priority criteria based on a relative importance of communications learned from an order in which an agent selected communications (abstract and figures 1 and 2).

As per claim 52, 55, 58 and 61, Erman discloses the priority codes are determined according to rules for prioritizing communications (abstract and figures 1 and 2).

As per claim 53, 56 and 59, Erman discloses the priority codes are assigned to communications without an assigned priority (abstract and figures 1 and 2).

As per claim 61, Erman discloses a decision engine that determines priority codes for items, which are tasks or communications (abstract and figures 1 and 2) and is capable of learning new priority criteria based on a relative importance of the items learned from an order in which an agent selected the items (abstract and figures 1 and 2).

As per claim 63, Erman discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1 and 2), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1 and 2) and is capable of learning new rules for prioritizing items based on positive and negative feedback related to a relative importance of items based on an order in which an agent selected the items (abstract and figures 1 and 2) and at least one queue configured to store the items in order of the priority code (abstract and figures 1 and 2).

As per claim 64, Erman discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1 and 2), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1 and 2) and is capable of learning new rules for prioritizing items based on a relative importance of items learned from an order in which an agent selected the items (abstract and figures 1 and 2) and includes a parser and is configured to analyze text, voice, natural language content, emotional content, identify keywords, identify concepts (abstract and figures 1 and 2)

and determine relationships between the concepts of the items received (abstract and figures 1 and 2) and at least one queue configured to store the items in order of the priority code (abstract and figures 1 and 2).

As per claim 65, Erman discloses automatically learning a new priority rule based on an order in which an agent selected items, which are communications or tasks (abstract and figures 1 and 2) and automatically determining priority codes for the items using the new priority rule (abstract and figures 1 and 2).

As per claim 66, Erman discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1 and 2) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1 and 2) automatically determining priority codes for the items using the new priority rule (abstract and figures 1 and 2) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1 and 2).

As per clam 67, Erman discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1 and 2) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1 and 2) automatically determining priority codes for the items using the new priority rule (abstract and figures 1 and 2) parsing the items including analyzing text contents of items containing text of the items (abstract and figures 1 and 2) analyzing voice contents of items having voice contents of the items (abstract and figures 1 and 2), analyzing natural language contents of items

containing natural language of the items (abstract and figures 1 and 2), analyzing emotional contents of items having emotional content of the items (abstract and figures 1 and 2) identifying keywords of items containing words of the items (abstract and figures 1 and 2) identifying concepts of the item that contain concepts (abstract and figures 1 and 2) and determining relationships between the concepts of items having relationships between the concepts of the items (abstract and figures 1 and 2) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1 and 2).

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-49 and 51-67 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Nagase, U.S. Pat. No. 5687384.

As per claim 1, Nagase discloses a contact center configured to receive said communications (abstract and figures 1-3) a decision engine configured to determine a priority code for each of said received communications (abstract and figures 1-3) and at least one queue configured to store said prioritized communications in order of priority code (abstract and figures 1-3).

AS per claim 18, Nagase discloses a contact center configured to receive said tasks (abstract and figures 1-3) a decision engine configured to determine a priority code for each of said tasks (abstract and figures 1-3) and at least one queue configured to store said tasks in order of priority code (abstract and figures 1-3).

AS per claim 35, Nagase discloses receiving said communications (abstract and figures 1-3) determining a priority code for each of said received communications (abstract and figures 1-3) and storing said prioritized communications in at least one queue according to priority code (abstract and figures 1-3).

As per claims 2, 19 and 36, Nagase discloses includes a parser configured to analyze content of said received communications/tasks (abstract and figures 1-3).

As per claim 3, 20 and 37, Nagase discloses communications/tasks include text communications/tasks and said decision engine includes a parser configured to parse text of said text communications/tasks (abstract and figures 1-3).

As per claims 4, 21 and 38, Nagase discloses text communications/tasks contain natural language that is parsed by said parser (abstract and figures 1-3).

As per claims 5, 22 and 39, Nagase discloses identifies concepts of said received communications/tasks (abstract and figures 1-3).

As per claims 6 and 23, Nagase discloses parser identifies relationships between said concepts (abstract and figures 1-3).

As per claim 7, 24 and 40, Nagase discloses compares said concepts with priority criteria to determine said priority codes (abstract and figures 1-3).

As per claims 8, 25 and 41, Nagase discloses received communications/tasks by identifying keywords in said received communications/tasks (abstract and figures 1-3).

AS per claims 9, 26 and 42, Nagase discloses received by said contact center via a text-based communication/tasks channel (abstract and figures 1-3).

As per claim 10, 27 and 43, Nagase discloses communications/tasks are voice communications/tasks and said decision engine includes a parser configured to analyze content of said voice communications/tasks (abstract and figures 1-3).

As per claims 11, 28 and 44, Nagase discloses an agent having a judgment of priority selects prioritized communications from said queue according to said judgment of priority (abstract and figures 1-3).

As per claims 12, 29 and 45, Nagase discloses a monitoring module configured to monitor communications selected by said agent and to provide said selected communications and priority codes of said selected communications as feedback to said decision engine (abstract and figures 1-3).

As per claims 13, 30 and 46, Nagase discloses utilizes said feedback to adjust priority criteria used to determine priority of said received communications (abstract and figures 1-3).

As per claims 14 and 31, Nagase discloses a parser configured to parse said received communications and a priority module configured to receive parsed communications from said

parser and determine said priority code for each of said parsed communications (abstract and figures 1-3).

As per claims 15 and 32, Nagase discloses priority module is a learning system and receives feedback from a monitoring module that monitors communications selected from said queue by at least one agent (abstract and figures 1-3).

As per claims 16 and 33, Nagase discloses priority module is a rule-based system that determines said priority code according to a set of predetermined rules (abstract and figures 1-3).

AS per clams 17 and 34, Nagase discloses priority code is determined in accordance with priority guidelines established by a user of said system (abstract and figures 1-3).

As per claim 47, Nagase discloses converting said voice communications into text communications prior to determining said priority code (abstract and figures 1-3).

AS per claim 48, Nagase discloses analyzing content of said voice communications includes identifying emotional content (abstract and figures 1-3).

As per claim 49, Nagase discloses means for receiving said communications (abstract and figures 1-3) means for determining a priority code for each of said received communications (abstract and figures 1-3) and means for storing said prioritized communications in order of priority code (abstract and figures 1-3).

As per claims 51, 54, 57 and 60, Nagase discloses the decision engine is capable of learning new priority criteria based on a relative importance of communications learned from an order in which an agent selected communications (abstract and figures 1-3).

As per claim 52, 55, 58 and 61, Nagase discloses the priority codes are determined according to rules for prioritizing communications (abstract and figures 1-3).

As per claim 53, 56 and 59, Nagase discloses the priority codes are assigned to communications without an assigned priority (abstract and figures 1-3).

As per claim 61, Nagase discloses a decision engine that determines priority codes for items, which are tasks or communications (abstract and figures 1-3) and is capable of learning new priority criteria based on a relative importance of the items learned from an order in which an agent selected the items (abstract and figures 1-3).

As per claim 63, Nagase discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and is capable of learning new rules for prioritizing items based on positive and negative feedback related to a relative importance of items based on an order in which an agent selected the items (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 64, Nagase discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and

is capable of learning new rules for prioritizing items based on a relative importance of items learned from an order in which an agent selected the items (abstract and figures 1-3) and includes a parser and is configured to analyze text, voice, natural language content, emotional content, identify keywords, identify concepts (abstract and figures 1-3) and determine relationships between the concepts of the items received (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 65, Nagase discloses automatically learning a new priority rule based on an order in which an agent selected items, which are communications or tasks (abstract and figures 1-3) and automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3).

As per claim 66, Nagase discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3) automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

As per clam 67, Nagase discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3) automatically determining priority codes for the items using the new priority rule (abstract and

figures 1-3) parsing the items including analyzing text contents of items containing text of the items (abstract and figures 1-3) analyzing voice contents of items having voice contents of the items (abstract and figures 1-3), analyzing natural language contents of items containing natural language of the items (abstract and figures 1-3), analyzing emotional contents of items having emotional content of the items (abstract and figures 1-3) identifying keywords of items containing words of the items (abstract and figures 1-3) identifying concepts of the item that contain concepts (abstract and figures 1-3) and determining relationships between the concepts of items having relationships between the concepts of the items (abstract and figures 1-3) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b).

Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-49 and 51-67 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Ramani et al, U.S. Pat. 6442542.

As per claim 1, Ramani discloses a contact center configured to receive said communications (abstract and figures 1-3), a decision engine configured to determine a priority code for each of said received communications (abstract and figures 1-3) and at least one queue configured to store said prioritized communications in order of priority code (abstract and figures 1-3).

AS per claim 18, Ramani discloses a contact center configured to receive said tasks (abstract and figures 1-3), a decision engine configured to determine a priority code for each of said tasks (abstract and figures 1-3) and at least one queue configured to store said tasks in order of priority code (abstract and figures 1-3).

AS per claim 35, Ramani discloses receiving said communications (abstract and figures 1-3), determining a priority code for each of said received communications (abstract and figures 1-3) and storing said prioritized communications in at least one queue according to priority code (abstract and figures 1-3).

As per claims 2, 19 and 36, Ramani discloses includes a parser configured to analyze content of said received communications/tasks (abstract and figures 1-3).

As per claim 3, 20 and 37, Ramani discloses communications/tasks include text communications/tasks and said decision engine includes a parser configured to parse text of said text communications/tasks (abstract and figures 1-3).

As per claims 4, 21 and 38, Ramani discloses text communications/tasks contain natural language that is parsed by said parser (abstract and figures 1-3).

As per claims 5, 22 and 39, Ramani discloses identifies concepts of said received communications/tasks (abstract and figures 1-3).

As per claims 6 and 23, Ramani discloses parser identifies relationships between said concepts (abstract and figures 1-3).

As per claim 7, 24 and 40, Ramani discloses compares said concepts with priority criteria to determine said priority codes (abstract and figures 1-3).

As per claims 8, 25 and 41, Ramani discloses received communications/tasks by identifying keywords in said received communications/tasks (abstract and figures 1-3).

AS per claims 9, 26 and 42, Ramani discloses received by said contact center via a text-based communication/tasks channel (abstract and figures 1-3).

As per claim 10, 27 and 43, Ramani discloses communications/tasks are voice communications/tasks and said decision engine includes a parser configured to analyze content of said voice communications/tasks (abstract and figures 1-3).

As per claims 11, 28 and 44, Ramani discloses an agent having a judgment of priority selects prioritized communications from said queue according to said judgment of priority (abstract and figures 1-3).

As per claims 12, 29 and 45, Ramani discloses a monitoring module configured to monitor communications selected by said agent and to provide said selected communications and priority codes of said selected communications as feedback to said decision engine (abstract and figures 1-3).

As per claims 13, 30 and 46, Ramani discloses utilizes said feedback to adjust priority criteria used to determine priority of said received communications (abstract and figures 1-3).

As per claims 14 and 31, Ramani discloses a parser configured to parse said received communications and a priority module configured to receive parsed communications from said parser and determine said priority code for each of said parsed communications (abstract and figures 1-3).

As per claims 15 and 32, Ramani discloses priority module is a learning system and receives feedback from a monitoring module that monitors communications selected from said queue by at least one agent (abstract and figures 1-3).

As per claims 16 and 33, Ramani discloses priority module is a rule-based system that determines said priority code according to a set of predetermined rules (abstract and figures 1-3).

AS per clams 17 and 34, Ramani discloses priority code is determined in accordance with priority guidelines established by a user of said system (abstract and figures 1-3).

As per claim 47, Ramani discloses converting said voice communications into text communications prior to determining said priority code (abstract and figures 1-3).

AS per claim 48, Ramani discloses analyzing content of said voice communications includes identifying emotional content (abstract and figures 1-3).

As per claim 49, Ramani discloses means for receiving said communications (abstract and figures 1-3), means for determining a priority code for each of said received communications (abstract and figures 1-3) and means for storing said prioritized communications in order of priority code (abstract and figures 1-3).

As per claims 51, 54, 57 and 60, Ramani discloses the decision engine is capable of learning new priority criteria based on a relative importance of communications learned from an order in which an agent selected communications (abstract and figures 1-3).

As per claim 52, 55, 58 and 61, Ramani discloses the priority codes are determined according to rules for prioritizing communications (abstract and figures 1-3).

As per claim 53, 56 and 59, Ramani discloses the priority codes are assigned to communications without an assigned priority (abstract and figures 1-3).

As per claim 61, Ramani discloses a decision engine that determines priority codes for items, which are tasks or communications (abstract and figures 1-3) and is capable of learning new priority criteria based on a relative importance of the items learned from an order in which an agent selected the items (abstract and figures 1-3).

As per claim 63, Ramani discloses a contact center configured to receive items, which are

communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and is capable of learning new rules for prioritizing items based on positive and negative feedback related to a relative importance of items based on an order in which an agent selected the items (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 64, Ramani discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and is capable of learning new rules for prioritizing items based on a relative importance of items learned from an order in which an agent selected the items (abstract and figures 1-3) and includes a parser and is configured to analyze text, voice, natural language content, emotional content, identify keywords, identify concepts (abstract and figures 1-3) and determine relationships between the concepts of the items received (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 65, Ramani discloses automatically learning a new priority rule based on an order in which an agent selected items, which are communications or tasks (abstract and figures

1-3) and automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3).

As per claim 66, Ramani discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3), automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3), automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

As per clam 67, Ramani discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3), automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3), automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3), parsing the items including analyzing text contents of items containing text of the items (abstract and figures 1-3), analyzing voice contents of items having voice contents of the items (abstract and figures 1-3), analyzing natural language contents of items containing natural language of the items (abstract and figures 1-3), analyzing emotional contents of items having emotional content of the items (abstract and figures 1-3), identifying keywords of items containing words of the items (abstract and figures 1-3), identifying concepts of the item that contain concepts (abstract and figures 1-3) and determining relationships between the concepts of items having relationships between the concepts of the items (abstract and figures 1-3) and

storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

4. Applicant's arguments filed June 11, 2003 have been fully considered but they are not persuasive.

Applicant argues at page 3, lines 1 and 3 that Neither of these figures discloses a contact center configures to receive communication". Applicant contact center is broad term which include a computer. Since figure Ramani discloses a computer (see figures 1 and 2). Therefore, Ramani discloses a contact center configures to receive communication.

Applicant further argues on page 3, first paragraph that "The knowledge engineering tool and the knowledge base of *Erman* do not receive communications and do not determine a priority code of anything". Examiner did not recite that Knowledge engineering tool and the knowledge base receives communication and determines a priority code. Examiner refers to abstract and figures 1 and 2 as a source of receiving communication and determining a priority code. Again "receives communication and determines a priority code" is broad term and any computer could receives communication and determines a priority code (see Erman, figure 2).

All other arguments follow the same line of above arguements. Therefore, Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CAR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CAR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Davis whose telephone number is (703) 305-3891. The examiner can normally be reached on Monday through Thursday from 7:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anil Khatri, can be reached on (703) 305-0282. The fax phone number for the organization where this application or proceeding is assigned is (703) 746-7240.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

August 24, 2003

GEORGE B. DAVIS

PRIMARY PATENT EXAMINER

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,152	12/04/2001	Yoram Nelken	PA2325	3645

22830 7590 03/13/2003

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EXAMINER
DAVIS, GEORGE B

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
10/008152	Yoram Neiken
Examiner	**Group Art Unit**
George Davis	2121

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE Three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If th period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication .
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

☒ Responsive to communication(s) filed on 12/4/01.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-49 and 51-67 is/are pending in the application.

Of the above claim(s)_____ is/are withdrawn from consideration.

☐ Claim(s)_____ is/are allowed.

☒ Claim(s) 1-49 and 51-67 is/are rejected.

☐ Claim(s)_____ is/are objected to.

☐ Claim(s)_____ are subject to restriction or election requirement.

Applicati n Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on_____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on_____ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number)_____.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received:_____.

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5

☐ Int rview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing R view, PTO-948

☐ Other_____

Office Action Summary

Notice of Referenc s Cited

Application N.	Applicant(s)		
10/008152	Yoram Nelken		
Examiner	Group Art Unit	Page 1 of 1	
George Davis	2121		

U.S. PATENT DOCUMENTS

*		DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
	A	4658370	4/87	Erman etal	706	60
	B	6442542B1	8/02	Ramani etal	707	3
	C	5878386	3/99	Coughlin	704	10
	D	6493694B1	12/02	Xu etal	706	47
	E	6070149	5/00	Tavor etal	705	26
	F	5228116	7/93	Harris etal	706	50
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
	N						
	O						
	P						
	Q						
	R						
	S						
	T						

NON-PATENT DOCUMENTS

*		DOCUMENT (Including Author, Title, Source, and Pertinent Pages)	DATE
	U		
	V		
	W		
	X		

* A copy of this reference is not being funished with this Office action.
(See Manual of Patent Examining Procedure, Section 707.05(a).)

DETAILED ACTION

Claim Rejections - 35 U.S.C. § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-49 and 51-67 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Erman et, U.S. Pat. No. 4658370.

As per claim 1, Erman discloses a contact center configured to receive said communications (abstract and figures 1 and 2), a decision engine configured to determine a priority code for each of said received communications (abstract and figures 1 and 2) and at least one queue configured to store said prioritized communications in order of priority code (abstract and figures 1 and 2).

AS per claim 18, Erman discloses a contact center configured to receive said tasks (abstract and figures 1 and 2), a decision engine configured to determine a priority code for each of said tasks (abstract and figures 1 and 2) and at least one queue configured to store said tasks in order of priority code (abstract and figures 1 and 2).

AS per claim 35, Erman discloses receiving said communications (abstract and figures 1 and 2), determining a priority code for each of said received communications (abstract and

figures 1 and 2) and storing said prioritized communications in at least one queue according to priority code (abstract and figures 1 and 2).

As per claims 2, 19 and 36, Erman discloses includes a parser configured to analyze content of said received communications/tasks (abstract and figures 1 and 2).

As per claim 3, 20 and 37, Erman discloses communications/tasks include text communications/tasks and said decision engine includes a parser configured to parse text of said text communications/tasks (abstract and figures 1 and 2).

As per claims 4, 21 and 38, Erman discloses text communications/tasks contain natural language that is parsed by said parser (abstract and figures 1 and 2).

As per claims 5, 22 and 39, Erman discloses identifies concepts of said received communications/tasks (abstract and figures 1 and 2).

As per claims 6 and 23, Erman discloses parser identifies relationships between said concepts (abstract and figures 1 and 2).

As per claim 7, 24 and 40, Erman discloses compares said concepts with priority criteria to determine said priority codes (abstract and figures 1 and 2).

As per claims 8, 25 and 41, Erman discloses received communications/tasks by identifying keywords in said received communications/tasks (abstract and figures 1 and 2).

AS per claims 9, 26 and 42, Erman discloses received by said contact center via a text-based communication/tasks channel (abstract and figures 1 and 2).

As per claim 10, 27 and 43, Erman discloses communications/tasks are voice communications/tasks and said decision engine includes a parser configured to analyze content of said voice communications/tasks (abstract and figures 1 and 2).

As per claims 11, 28 and 44, Erman discloses an agent having a judgment of priority selects prioritized communications from said queue according to said judgment of priority (abstract and figures 1 and 2).

As per claims 12, 29 and 45, Erman discloses a monitoring module configured to monitor communications selected by said agent and to provide said selected communications and priority codes of said selected communications as feedback to said decision engine (abstract and figures 1 and 2).

As per claims 13, 30 and 46, Erman discloses utilizes said feedback to adjust priority criteria used to determine priority of said received communications (abstract and figures 1 and 2).

As per claims 14 and 31, Erman discloses a parser configured to parse said received communications and a priority module configured to receive parsed communications from said parser and determine said priority code for each of said parsed communications (abstract and figures 1 and 2).

As per claims 15 and 32, Erman discloses priority module is a learning system and receives feedback from a monitoring module that monitors communications selected from said queue by at least one agent (abstract and figures 1 and 2).

As per claims 16 and 33, Erman discloses priority module is a rule-based system that determines said priority code according to a set of predetermined rules (abstract and figures 1 and 2).

AS per clams 17 and 34, Erman discloses priority code is determined in accordance with priority guidelines established by a user of said system (abstract and figures 1 and 2).

As per claim 47, Erman discloses converting said voice communications into text communications prior to determining said priority code (abstract and figures 1 and 2).

AS per claim 48, Erman discloses analyzing content of said voice communications includes identifying emotional content (abstract and figures 1 and 2).

As per claim 49, Erman discloses means for receiving said communications (abstract and figures 1 and 2), means for determining a priority code for each of said received communications (abstract and figures 1 and 2) and means for storing said prioritized communications in order of priority code (abstract and figures 1 and 2).

As per claims 51, 54, 57 and 60, Erman discloses the decision engine is capable of learning new priority criteria based on a relative importance of communications learned from an order in which an agent selected communications (abstract and figures 1 and 2).

As per claim 52, 55, 58 and 61, Erman discloses the priority codes are determined according to rules for prioritizing communications (abstract and figures 1 and 2).

As per claim 53, 56 and 59, Erman discloses the priority codes are assigned to communications without an assigned priority (abstract and figures 1 and 2).

As per claim 61, Erman discloses a decision engine that determines priority codes for items, which are tasks or communications (abstract and figures 1 and 2) and is capable of learning new priority criteria based on a relative importance of the items learned from an order in which an agent selected the items (abstract and figures 1 and 2).

As per claim 63, Erman discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1 and 2), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1 and 2) and is capable of learning new rules for prioritizing items based on positive and negative feedback related to a relative importance of items based on an order in which an agent selected the items (abstract and figures 1 and 2) and at least one queue configured to store the items in order of the priority code (abstract and figures 1 and 2).

As per claim 64, Erman discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1 and 2), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1 and 2) and is capable of learning new rules for prioritizing items based on a relative importance of items learned from an order in which an agent selected the items (abstract and figures 1 and 2) and includes a parser and is configured to analyze text, voice, natural language content, emotional content, identify keywords, identify concepts (abstract and figures 1 and 2)

and determine relationships between the concepts of the items received (abstract and figures 1 and 2) and at least one queue configured to store the items in order of the priority code (abstract and figures 1 and 2).

As per claim 65, Erman discloses automatically learning a new priority rule based on an order in which an agent selected items, which are communications or tasks (abstract and figures 1 and 2) and automatically determining priority codes for the items using the new priority rule (abstract and figures 1 and 2).

As per claim 66, Erman discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1 and 2) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1 and 2) automatically determining priority codes for the items using the new priority rule (abstract and figures 1 and 2) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1 and 2).

As per clam 67, Erman discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1 and 2) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1 and 2) automatically determining priority codes for the items using the new priority rule (abstract and figures 1 and 2) parsing the items including analyzing text contents of items containing text of the items (abstract and figures 1 and 2) analyzing voice contents of items having voice contents of the items (abstract and figures 1 and 2), analyzing natural language contents of items

containing natural language of the items (abstract and figures 1 and 2), analyzing emotional contents of items having emotional content of the items (abstract and figures 1 and 2) identifying keywords of items containing words of the items (abstract and figures 1 and 2) identifying concepts of the item that contain concepts (abstract and figures 1 and 2) and determining relationships between the concepts of items having relationships between the concepts of the items (abstract and figures 1 and 2) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1 and 2).

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-49 and 51-67 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Nagase, U.S. Pat. No. 5687384.

As per claim 1, Nagase discloses a contact center configured to receive said communications (abstract and figures 1-3) a decision engine configured to determine a priority code for each of said received communications (abstract and figures 1-3) and at least one queue configured to store said prioritized communications in order of priority code (abstract and figures 1-3).

AS per claim 18, Nagase discloses a contact center configured to receive said tasks (abstract and figures 1-3) a decision engine configured to determine a priority code for each of said tasks (abstract and figures 1-3) and at least one queue configured to store said tasks in order of priority code (abstract and figures 1-3).

AS per claim 35, Nagase discloses receiving said communications (abstract and figures 1-3) determining a priority code for each of said received communications (abstract and figures 1-3) and storing said prioritized communications in at least one queue according to priority code (abstract and figures 1-3).

As per claims 2, 19 and 36, Nagase discloses includes a parser configured to analyze content of said received communications/tasks (abstract and figures 1-3).

As per claim 3, 20 and 37, Nagase discloses communications/tasks include text communications/tasks and said decision engine includes a parser configured to parse text of said text communications/tasks (abstract and figures 1-3).

As per claims 4, 21 and 38, Nagase discloses text communications/tasks contain natural language that is parsed by said parser (abstract and figures 1-3).

As per claims 5, 22 and 39, Nagase discloses identifies concepts of said received communications/tasks (abstract and figures 1-3).

As per claims 6 and 23, Nagase discloses parser identifies relationships between said concepts (abstract and figures 1-3).

As per claim 7, 24 and 40, Nagase discloses compares said concepts with priority criteria to determine said priority codes (abstract and figures 1-3).

As per claims 8, 25 and 41, Nagase discloses received communications/tasks by identifying keywords in said received communications/tasks (abstract and figures 1-3).

AS per claims 9, 26 and 42, Nagase discloses received by said contact center via a text-based communication/tasks channel (abstract and figures 1-3).

As per claim 10, 27 and 43, Nagase discloses communications/tasks are voice communications/tasks and said decision engine includes a parser configured to analyze content of said voice communications/tasks (abstract and figures 1-3).

As per claims 11, 28 and 44, Nagase discloses an agent having a judgment of priority selects prioritized communications from said queue according to said judgment of priority (abstract and figures 1-3).

As per claims 12, 29 and 45, Nagase discloses a monitoring module configured to monitor communications selected by said agent and to provide said selected communications and priority codes of said selected communications as feedback to said decision engine (abstract and figures 1-3).

As per claims 13, 30 and 46, Nagase discloses utilizes said feedback to adjust priority criteria used to determine priority of said received communications (abstract and figures 1-3).

As per claims 14 and 31, Nagase discloses a parser configured to parse said received communications and a priority module configured to receive parsed communications from said

parser and determine said priority code for each of said parsed communications (abstract and figures 1-3).

As per claims 15 and 32, Nagase discloses priority module is a learning system and receives feedback from a monitoring module that monitors communications selected from said queue by at least one agent (abstract and figures 1-3).

As per claims 16 and 33, Nagase discloses priority module is a rule-based system that determines said priority code according to a set of predetermined rules (abstract and figures 1-3).

AS per clams 17 and 34, Nagase discloses priority code is determined in accordance with priority guidelines established by a user of said system (abstract and figures 1-3).

As per claim 47, Nagase discloses converting said voice communications into text communications prior to determining said priority code (abstract and figures 1-3).

AS per claim 48, Nagase discloses analyzing content of said voice communications includes identifying emotional content (abstract and figures 1-3).

As per claim 49, Nagase discloses means for receiving said communications (abstract and figures 1-3) means for determining a priority code for each of said received communications (abstract and figures 1-3) and means for storing said prioritized communications in order of priority code (abstract and figures 1-3).

As per claims 51, 54, 57 and 60, Nagase discloses the decision engine is capable of learning new priority criteria based on a relative importance of communications learned from an order in which an agent selected communications (abstract and figures 1-3).

As per claim 52, 55, 58 and 61, Nagase discloses the priority codes are determined according to rules for prioritizing communications (abstract and figures 1-3).

As per claim 53, 56 and 59, Nagase discloses the priority codes are assigned to communications without an assigned priority (abstract and figures 1-3).

As per claim 61, Nagase discloses a decision engine that determines priority codes for items, which are tasks or communications (abstract and figures 1-3) and is capable of learning new priority criteria based on a relative importance of the items learned from an order in which an agent selected the items (abstract and figures 1-3).

As per claim 63, Nagase discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and is capable of learning new rules for prioritizing items based on positive and negative feedback related to a relative importance of items based on an order in which an agent selected the items (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 64, Nagase discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and

is capable of learning new rules for prioritizing items based on a relative importance of items learned from an order in which an agent selected the items (abstract and figures 1-3) and includes a parser and is configured to analyze text, voice, natural language content, emotional content, identify keywords, identify concepts (abstract and figures 1-3) and determine relationships between the concepts of the items received (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 65, Nagase discloses automatically learning a new priority rule based on an order in which an agent selected items, which are communications or tasks (abstract and figures 1-3) and automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3).

As per claim 66, Nagase discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3) automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

As per clam 67, Nagase discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3) automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3) automatically determining priority codes for the items using the new priority rule (abstract and

figures 1-3) parsing the items including analyzing text contents of items containing text of the items (abstract and figures 1-3) analyzing voice contents of items having voice contents of the items (abstract and figures 1-3), analyzing natural language contents of items containing natural language of the items (abstract and figures 1-3), analyzing emotional contents of items having emotional content of the items (abstract and figures 1-3) identifying keywords of items containing words of the items (abstract and figures 1-3) identifying concepts of the item that contain concepts (abstract and figures 1-3) and determining relationships between the concepts of items having relationships between the concepts of the items (abstract and figures 1-3) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b).

Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-49 and 51-67 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Ramani et al, U.S. Pat. 6442542.

As per claim 1, Ramani discloses a contact center configured to receive said communications (abstract and figures 1-3), a decision engine configured to determine a priority code for each of said received communications (abstract and figures 1-3) and at least one queue configured to store said prioritized communications in order of priority code (abstract and figures 1-3).

AS per claim 18, Ramani discloses a contact center configured to receive said tasks (abstract and figures 1-3), a decision engine configured to determine a priority code for each of said tasks (abstract and figures 1-3) and at least one queue configured to store said tasks in order of priority code (abstract and figures 1-3).

AS per claim 35, Ramani discloses receiving said communications (abstract and figures 1-3), determining a priority code for each of said received communications (abstract and figures 1-3) and storing said prioritized communications in at least one queue according to priority code (abstract and figures 1-3).

As per claims 2, 19 and 36, Ramani discloses includes a parser configured to analyze content of said received communications/tasks (abstract and figures 1-3).

As per claim 3, 20 and 37, Ramani discloses communications/tasks include text communications/tasks and said decision engine includes a parser configured to parse text of said text communications/tasks (abstract and figures 1-3).

As per claims 4, 21 and 38, Ramani discloses text communications/tasks contain natural language that is parsed by said parser (abstract and figures 1-3).

As per claims 5, 22 and 39, Ramani discloses identifies concepts of said received communications/tasks (abstract and figures 1-3).

As per claims 6 and 23, Ramani discloses parser identifies relationships between said concepts (abstract and figures 1-3).

As per claim 7, 24 and 40, Ramani discloses compares said concepts with priority criteria to determine said priority codes (abstract and figures 1-3).

As per claims 8, 25 and 41, Ramani discloses received communications/tasks by identifying keywords in said received communications/tasks (abstract and figures 1-3).

AS per claims 9, 26 and 42, Ramani discloses received by said contact center via a text-based communication/tasks channel (abstract and figures 1-3).

As per claim 10, 27 and 43, Ramani discloses communications/tasks are voice communications/tasks and said decision engine includes a parser configured to analyze content of said voice communications/tasks (abstract and figures 1-3).

As per claims 11, 28 and 44, Ramani discloses an agent having a judgment of priority selects prioritized communications from said queue according to said judgment of priority (abstract and figures 1-3).

As per claims 12, 29 and 45, Ramani discloses a monitoring module configured to monitor communications selected by said agent and to provide said selected communications and priority codes of said selected communications as feedback to said decision engine (abstract and figures 1-3).

As per claims 13, 30 and 46, Ramani discloses utilizes said feedback to adjust priority criteria used to determine priority of said received communications (abstract and figures 1-3).

As per claims 14 and 31, Ramani discloses a parser configured to parse said received communications and a priority module configured to receive parsed communications from said parser and determine said priority code for each of said parsed communications (abstract and figures 1-3).

As per claims 15 and 32, Ramani discloses priority module is a learning system and receives feedback from a monitoring module that monitors communications selected from said queue by at least one agent (abstract and figures 1-3).

As per claims 16 and 33, Ramani discloses priority module is a rule-based system that determines said priority code according to a set of predetermined rules (abstract and figures 1-3).

AS per clams 17 and 34, Ramani discloses priority code is determined in accordance with priority guidelines established by a user of said system (abstract and figures 1-3).

As per claim 47, Ramani discloses converting said voice communications into text communications prior to determining said priority code (abstract and figures 1-3).

AS per claim 48, Ramani discloses analyzing content of said voice communications includes identifying emotional content (abstract and figures 1-3).

As per claim 49, Ramani discloses means for receiving said communications (abstract and figures 1-3), means for determining a priority code for each of said received communications (abstract and figures 1-3) and means for storing said prioritized communications in order of priority code (abstract and figures 1-3).

As per claims 51, 54, 57 and 60, Ramani discloses the decision engine is capable of learning new priority criteria based on a relative importance of communications learned from an order in which an agent selected communications (abstract and figures 1-3).

As per claim 52, 55, 58 and 61, Ramani discloses the priority codes are determined according to rules for prioritizing communications (abstract and figures 1-3).

As per claim 53, 56 and 59, Ramani discloses the priority codes are assigned to communications without an assigned priority (abstract and figures 1-3).

As per claim 61, Ramani discloses a decision engine that determines priority codes for items, which are tasks or communications (abstract and figures 1-3) and is capable of learning new priority criteria based on a relative importance of the items learned from an order in which an agent selected the items (abstract and figures 1-3).

As per claim 63, Ramani discloses a contact center configured to receive items, which are

communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and is capable of learning new rules for prioritizing items based on positive and negative feedback related to a relative importance of items based on an order in which an agent selected the items (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 64, Ramani discloses a contact center configured to receive items, which are communications or tasks (abstract and figures 1-3), a decision engine that determines a priority code for each of the items received according to rules for prioritizing the items, is capable of determining the priority code for items without an assigned priority (abstract and figures 1-3) and is capable of learning new rules for prioritizing items based on a relative importance of items learned from an order in which an agent selected the items (abstract and figures 1-3) and includes a parser and is configured to analyze text, voice, natural language content, emotional content, identify keywords, identify concepts (abstract and figures 1-3) and determine relationships between the concepts of the items received (abstract and figures 1-3) and at least one queue configured to store the items in order of the priority code (abstract and figures 1-3).

As per claim 65, Ramani discloses automatically learning a new priority rule based on an order in which an agent selected items, which are communications or tasks (abstract and figures

1-3) and automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3).

As per claim 66, Ramani discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3), automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3), automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3) and storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

As per clam 67, Ramani discloses receiving items, which are communications or tasks that do not have a previously assigned priority (abstract and figures 1-3), automatically learning a new priority rule based on an order in which an agent selected the items (abstract and figures 1-3), automatically determining priority codes for the items using the new priority rule (abstract and figures 1-3), parsing the items including analyzing text contents of items containing text of the items (abstract and figures 1-3), analyzing voice contents of items having voice contents of the items (abstract and figures 1-3), analyzing natural language contents of items containing natural language of the items (abstract and figures 1-3), analyzing emotional contents of items having emotional content of the items (abstract and figures 1-3), identifying keywords of items containing words of the items (abstract and figures 1-3), identifying concepts of the item that contain concepts (abstract and figures 1-3) and determining relationships between the concepts of items having relationships between the concepts of the items (abstract and figures 1-3) and

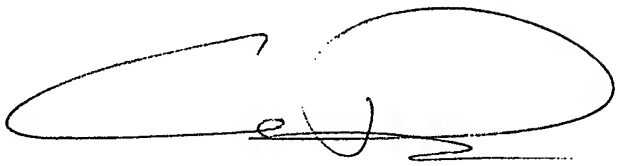
storing the items prioritized in at least one queue according to the priority code (abstract and figures 1-3).

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Davis whose telephone number is (703) 305-3891. The examiner can normally be reached on Monday through Thursday from 7:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee, can be reached on (703) 305-8498. The fax phone number for the organization where this application or proceeding is assigned is (703) 746-7240.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

March 6 , 2003



GEORGE B. DAVIS

PRIMARY PATENT EXAMINER

SYSTEM AND METHOD FOR ELECTRONIC COMMUNICATION MANAGEMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is related to, and claims the benefit of, U.S. Provisional Patent Application Serial No. 60/176,411, entitled "System and Method for Effective and Efficient Electronic Communication Management," filed January 13, 2000, which is hereby incorporated by reference. This application is also related to U.S. Patent Application No. 09/602,588, entitled "System and Method for Automatic Task Prioritization," filed June 21, 2000, and U.S. Patent Application No. 09/624,361, entitled "System and Method for Optimizing Timing of Responses to Customer Communications," filed July 24,2000, which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to electronic communications and relates more particularly to a system and method for electronic communication management.

2. Description of the Background Art

In a typical organization, communications with customers and others may occur via a variety of different channels. In addition to traditional

channels such as letters and telephone calls, customers may also communicate with an organization via electronic mail, facsimile, web-based forms, web-based chat, and wireless communication and voice. An organization will most likely incorporate these and any other newly developed communication channels to allow customers to communicate in a way they find most convenient.

Many of the communication channels mentioned above contain information that is unstructured in nature, usually expressed in natural language. Different customers may make identical requests each in a unique way, using different communication channels, different words, or both. Human agents are usually required to review each natural language communication to evaluate the customer's intent, and to determine what information or action would be responsive to that intent.

Agents typically must look to various sources to gather all of the information required to respond appropriately to a customer communication. The information may be retrieved from a variety of sources, such as legacy systems, databases, back office systems, and front office systems. Each of these sources may store data in a unique structure or format. An agent typically gathers and organizes the required information from one or more of these information sources and uses the information to compose an appropriate content-rich reply that is responsive to the customer's intent.

Utilizing people to respond to customer communications is often rather inefficient. In addition, an increase in the number of communications received

by an organization typically requires an exponential increase in the number of people required to provide an acceptable level of customer service.

Several types of automatic systems exist for responding to customer communications. Rule-based systems, keyword-based systems, and statistical systems typically do not perform with the necessary accuracy to substantially automate business processes, such as responding to customer inquiries, and require a large investment in resources to keep them up-to-date. Many learning systems utilize a training set of data that is a poor representation of the system's world, which reduces the accuracy of the system and makes the process of updating the system very cumbersome.

SUMMARY OF INVENTION

The invention provides a system and method for electronic communication management. The system comprises a contact center, a modeling engine, an adaptive knowledge base, and a feedback module. The contact center may send and receive communications via various communication channels including phone, facsimile, electronic mail, web forms, chat, and wireless. The modeling engine analyzes received communications to determine an intent. For received communications containing natural language text, the modeling engine performs morphological, semantic, and other analyses. For voice-based communications, the system performs various digital signal processing tasks.

The adaptive knowledge base stores models that are used to predict responses and actions to the received communications based on the intent identified by the modeling engine. The feedback module monitors actual responses to the received communications and compares them to the predicted responses. If a predicted response is substantially the same as the actual response, the model or models that predicted the response are updated with positive feedback. The feedback module supports multiple feedbacks to a single communication. If a predicted response is substantially different than the actual response, the model or models that predicted the response are updated with negative feedback. The feedback process may be performed either in real time or off-line. Each model has an internal accuracy gauge that

is updated by the feedback. The system learns from every communication that is processed.

The modeling engine may also support various application specific modules, for example, an automatic response module, an automatic task prioritization module, an expertise based routing module, a content filter, a workflow application module, and a business process automation module. The modeling engine may also retrieve data from various sources, such as databases and back office systems, which relate to the intent of a communication.

The contact center converts each received communication into a universal data model format. The models in the adaptive knowledge base may also be expressed in the universal data model format, so that models of different types of data may be compared to each other.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram for one embodiment of an electronic communications system, according to the present invention;

FIG. 2 is a block diagram for one embodiment of the Modeling Engine of FIG.1, according to the present invention;

FIG. 3 is a flowchart of method steps for processing relationship events, according to one embodiment of the present invention; and

FIG. 4 is a diagram of relationship event processing, according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1, a block diagram of an electronic communication management system 100 is shown. System 100 includes, but is not limited to, a contact center 112, a universal data model 114, a modeling engine 116, an adaptive knowledge base 118, and data access services 120. Contact center 112 receives communications from a variety of channels. The channels include, but are not limited to, telephone 130, facsimile 131, electronic mail (Email) 132, web-based communications 133, chat communications 134, and wireless communications 135. Other types of electronic communications 136, for example a file transfer using the File Transfer Protocol (FTP), are within the scope of the present invention. New communication channels may be added without taking the system off-line.

The communications received by contact center 112 typically contain data or information that is unstructured in nature. With the exception of some web-based or other type of electronic forms, the communications usually contain information expressed in natural language. Each individual correspondent may compose a communication in a unique way, even when requesting the same type of information.

System 100 also includes data access services (middleware) 120 that retrieve data from various sources that include, but are not limited to, legacy systems 122, front office systems 123, back office systems 124, and databases 125, 126. These sources typically contain data that are structured, each

source potentially having its own data format. Data access services 120 of the present invention translate the data from each source to conform to a universal data model (UDM) 114 format, so that data from the various sources may be represented according to a common data structure. For example, a universal data model of front office data will have the same structure as a model of back office data.

Contact center 112 of the present invention translates incoming communications from the various communication channels to conform to universal data model 114, so that data from the various communication channels may be represented according to a common data structure. For example, a universal data model of a facsimile communication will have the same structure as a model of an email communication with any obviously necessary changes. The universal data model 114 of the present invention allows different types of data to be represented in a common data format, regardless of the source or type of data.

UDM 114 allows system 100 to analyze, model, and compare models of different types of data. System 100 may create and compare models of email communications, models of database information, and models of human agents. System 100 is able to compare a model of an email communication to a model of an agent, which in turn may be compared to a model of a business process because all models have the same universal structure. The universal data model 114 advantageously allows previously incompatible types of

information to be processed by the same system. The UDM 114 is a data driven model of information.

In one embodiment of system 100, UDM 114 includes concepts that are produced in a hierarchical processing scheme. Lower level concepts may be as general as single words from email texts, voice data, or may be as specific as field descriptors from a web-based form. Further processing allows system 100 to infer intents and other higher level concepts from the lower level concepts. Thus, a final representation of information in UDM 114 is identical for all information sources.

System 100 also includes a modeling engine (ME) 116. ME 116 is a tool that, in conjunction with UDM 114, allows system 100 to perform a myriad of tasks using data from various sources. ME 116 supports various Application Specific Modules (ASM) 140-146. The ASMs perform specialized operations using ME 116 in conjunction with models and information in the universal data format, and are discussed in further detail below.

To be able to support the ASMs, ME 116 monitors relationship events and business processes, and looks for semantical and other patterns. Relationship events are any communications between the organization and other external or internal entities. Relationship events may, for example, include an email from a customer, an order placed via a secure web-based ordering system, an email sent from a queue to an agent, a document

submitted to a document management system, and an automatic email response sent to a customer.

ME 116 builds semantical models based on relationship events. ME 116 continuously updates the models using positive and negative feedback (explicit or implicit) from system 100, and stores the models in Adaptive Knowledge Base (AKB) 118. Using the models, ME 116 learns the business processes of the system. The models in AKB 118 have strong predictive powers. Given a relationship event, a model is able to predict which other relationship events are likely to follow. For example, given an inquiry, system 100 can predict what is the most likely business response, such as answer, routing, or data association.

ME 116 monitors what business processes follow from a relationship event and determines whether these processes match a model's predictions. A response that matches the prediction is positive feedback that increases the model's accuracy rating, and a response that does not match the prediction is negative feedback that decreases the model's accuracy rating. Both positive and negative feedback adapts AKB 118. Feedback in the present invention is further discussed below in conjunction with FIG. 4.

ME 116 knows when it knows, and knows when it doesn't know, based on measured correlations between confirmed and unconfirmed predictions. ME 116 analyzes a relationship event and is able to recognize when the relationship event corresponds to a model in AKB 118 and when the event does not correspond to a model, or corresponds to a low-dependability model. When

a relationship event does not correspond to a model, ME 116 will typically route the event for handling by an agent, and then create a potential new model based on the event, or use predefined rules.

Since received communications are translated into the universal data format, ME 116 is able to learn from feedback for one communication channel and apply that knowledge to another communication channel. For example, feedback from an agent responding to inquiries received via Email 132 may result in knowledge that allows system 100 to automatically answer inquiries on a chat 134 channel, without reconfiguration of system 100.

AKB 118 organizes the models into various categories. Logically related categories are associated with a branch, which in turn may be associated with a branch of larger scope. Using similar statistical techniques to the ones described, creation of the hierarchies can be either manual (via a configuration tool or API) or automatic by monitoring feedback. In addition, some branches may be created with associated rules, which allows system 100 to be fine tuned and to detect non-business-compliant agent actions (e.g., submission of a secure communication over an unsecured communication channel).

AKB 118 may also include flat hierarchies as a special case of tree hierarchies. Other types of graphs, such as a cyclic layered graph, are within the scope of the invention. Incorporating relationship events into the branches of AKB 118 improves the predictive confidence of the branches. As new relationship events are received, new categories are created and new branches develop in AKB 118. The models are used to identify the underlying intent of a

relationship event, and to categorize the event based on various criteria, some of which are manual (based on rules) and others which are automatic (based on learning or training). AKB 118 categorizes events using a meta-language that is able to combine manual and automatic criteria.

ME 116 creates branches in AKB 118 using a semi-automatic process. At system start-up, the branching process is given information regarding the tasks or applications system 100 is to support, and some general guidelines on how to differentiate between them. The guidelines typically include hard rules combined with intent-based rules.

When system 100 is up and running, ME 116 uses feedback to modify the branches in AKB 118. ME 116 collects statistical data for intent-based branches, alerts system 100 when hard rules are violated, and monitors the performance of AKB 118. ME 116 also suggests structural changes to AKB 118. ME 116 may join branches that have similar statistical profiles. ME 116 may split branches into sub-branches using a modified expectation maximization process to increase the overall performance of system 100. ME 116 may also perform all of the above operations on a flat structure without branches.

Referring now to FIG. 2, a block diagram of ME 116 is shown, according to one embodiment of the present invention. ME 116 includes, but is not limited to, a Natural Language Processor (NLP) 210, and a Statistical Modeler 212. Natural Language Processor 210 evaluates customer communications in

natural language to determine the customer's intent and other relevant information. Data structures such as fixed fields in a web-based form are considered a subset of natural language.

NLP 210 includes, but is not limited to, a Language Dependent Module (LDM) 220 that extracts information from a natural language communication, and a Lexical Knowledge Base (LKB) 222 that include lexical, morphological, and semantic information. NLP 210 may identify the language of the communication and have separate LDMs 220 and dictionaries for various languages that operate simultaneously. LDM 220 identifies the content-rich parts of the relationship event, and corrects spelling and grammatical errors. In fact, LDM 220 expects poor grammar and broken text in relationship events, and does not rely upon accurate grammar to perform sentence analysis, which improves the accuracy of system 100.

LDM 220 performs text analysis using context rules. Some context rules are rigid rules and others are learned statistically from actual texts collected from previous relationship events. Grammar errors and broken text have only a "local" influence on the entire text analysis. Common errors are learned and are referred to as non-rigid rules.

LDM 220 may be modified to parse and understand specific classes of grammatical and syntactic errors that are characteristic of speakers of a particular non-native language. For example, a native German speaker writing in English may connect adjectives together as one word. LDM 220 will

recognize this type of error as one commonly made by native German speakers, and correct the error accordingly.

NLP 210 also collects other types of information about a relationship event. This information may include the use of passive voice, semantic information, contextual information, morphological information, and quantitative information. The quantitative information may include the number of sentences or number of exclamation points. NLP 210 identifies key concepts in a relationship event, which are basic components of language information. These components include, but are not limited to, sentences, words, stems, semantically significant constructs, the type and number of punctuation marks, strong use of the passive voice, dates, and currency amounts.

NLP 210 also identifies the modality of text from any text channel. NLP 210 identifies modes that include, but are not limited to, emotive language, the age or education of the writer, indications of large sums of money, and offensive content. NLP 210 also may identify the type of communication, for example inquiry, request, complaint, formal letter, resume, joke communication, and junk mail.

NLP 210 also includes Lexical Knowledge Base (LKB) 222. LKB 222 includes lexical, morphological, and semantic domains. The information in LKB 222 may be either general or domain dependent. LKB 222 may include, but is not limited to, a lexicon, a thesaurus, a spell checker, a morphological analyzer, and a tagger.

LKB 222 may be constructed off-line using predetermined semantical data, and may accumulate semantical data on-line by monitoring user actions. The semantic domain of LKB 222 is the main resource for ME 116 in creating meaningful models.

NLP 210 builds semantic models for relationship events using concepts described in or otherwise suggested by the event and the relationships between the concepts. As a very simple example, the statement "The book is on the table" contains the concepts "book" and "table." A semantic model would include these two concepts and show their relationship of one being "on" the other. NLP 210 also generalizes concepts based on feedback. For example, the statement "the book is on the table" could be generalized to a model that describes a written object on a piece of furniture. Thus, the statement "the newspaper is on the chair" could result in the same generalized model.

The second main component of ME 116 is the Statistical Modeler 212. Modeler 212 is used in training the system and creating models in conjunction with NLP 210. Statistical modeler 212 performs relationship algebra using the models in Adaptive Knowledge Base 118. Relationship algebra compares and modifies models.

For example, model A and model B represent business processes. If model A is compared to model B, a statistical score may be 70%. "Adding" model A with model B produces a new model A' (A+B=A'). If model A' is compared to model B, the statistical score may be 72%. By combining model B with model A, the resulting model A' is a little more like model B. "Subtracting"

model B from model A produces another new model A" (A-B=A"). If model A" is compared to model B, the statistical score may be 68%. Thus model A" is a little less like model B. ME 116 uses these and other types of relationship algebra operations to continuously update models. Feedback determines which operations are performed with the models. System 100 may expect some erroneous feedback, so not every operation necessarily directly affects the models. In some cases, ME 116 will look for supportive evidence before a particular action is incorporated into a model.

ME 116 maintains internal queues of potential models and potential concepts that are not in actual usage by system 100. ME 116 continuously checks and updates these potential models and concepts. ME 116 automatically collects domain knowledge, which is information about the world in which it lives. ME 116 creates the potential, or hypothetical, models when it sees a pattern of relationship events in the system. ME 116 tests these hypothetical models and incorporates data into the models when the data is deemed sufficiently accurate.

There are two potential main sources for loss of accuracy of models in a modeling system. The first source is variance, where there is not enough data to support a model. The second source is bias, where there are false beliefs about the data. ME 116 is capable of distinguishing between these two sources for loss of accuracy, and is able to accurately assess the amount of data that supports each model. ME 116 may thus decide when the data is sufficiently rich to support predictive use of a model.

Each model in Adaptive Knowledge Base 118 has an internal accuracy gauge that is updated continuously by feedback from the system. Positive feedback increases a model's accuracy rating, and negative feedback decreases the model's accuracy rating. Each model compares its prediction with the actual result or action of the system and responsively modifies its accuracy rating accordingly.

A model's accuracy is rated by recall and precision. A model's recall is the ratio of the number of events the model identified to the number of events the model should have identified. A model's precision is the ratio of the number of events the model identified correctly to the number of events the model identified. Recall and precision may be traded against one another. For example, high recall can be achieved by indiscriminately identifying all events, however this results in loss of precision. Alternatively, high precision can be achieved by identifying events for which the model has high confidence, but some events may be missed and recall would be lower. A good model should have high recall and high precision. Recall and precision measurements may be assessed using feedback from system 100. A statistical matching value between documents and models may also be evaluated by a calculated statistical likelihood value. The likelihood value may be calculated using an adaptive kernel method based on match value results of various categories.

For each branch, AKB 118 gathers statistical data that distinguishes the branch model from its background using significant concepts. AKB 118 contains two types of data, active concepts and candidate concepts that may

become active in the future. Feedback from system 100 is used to update both types of data. Each concept has an associated rate that relates to the difference between its expected contribution in relevant and irrelevant events.

The feedback process modifies the rates of the concepts. Each newly modified rate determines whether a candidate concept should become active, and whether an active concept should become inactive. The contribution of an active concept to branch classification is based on a log-likelihood-ratio between two statistical models that are built by interpolating the statistical data of the relevant models and the irrelevant models.

If a model's accuracy rating drops below a predetermined threshold, the model is marked as inaccurate and is not used by the system to make decisions. However, the model still receives data and makes predictions, which are compared to the actual performance of the system. The model continues to receive feedback and the accuracy rating continues to be updated. Use of the model will be resumed if and when the model regains an accuracy rating above the predetermined threshold.

When a model is being disregarded, the system may behave according to some predetermined rules, use keywords, or perform some other action like sending relationship events to a queue for processing by a human agent.

As ME 116 learns the business processes of the system, it becomes able to identify erroneous or malicious input by an agent. An agent may make errors that unintentionally damage the accuracy of the system, or may intentionally take incorrect actions to deliberately sabotage the accuracy of the

system. ME 116 can identify responses made by agents that do not fit the patterns predicted by the models. ME 116 identifies these responses by analyzing feedback that is very different from the system's predictions. Suspicious responses are identified according to the reliability of the origin of the response, and the difference between the system's decision and the feedback. ME 116 analyzes feedback according to its origin and will trace suspicious feedback, then obtain verification before using the feedback.

There are several ways in which ME 116 may be trained when a system initially goes on-line at an organization. In one embodiment, ME 116 is placed on-line with no active models. The system then receives live relationship events and begins building models. The accuracy of the models' predictions will increase as the number of relationship events increases.

In another embodiment, ME 116 receives historical relationship event data and builds models based on this data. Thus, ME 116 may be placed on-line with models in place that will be fairly accurate if the historical relationship event data is a fair representation of live relationship events.

In a further embodiment, ME 116 is placed on-line with no active models, and the system behaves according to a set of rules or logical expressions. ME 116 builds models based on live relationship events while the rules are in place. When the models reach an acceptable level of accuracy, the rules are automatically disregarded and the models take over the processing of events. If a model becomes inaccurate, the system may default back to the rules until the model becomes accurate again.

Returning to FIG. 1, one of the Application Specific Modules supported by ME 116 is an Automatic Response (AR) module 140. This module automatically composes and sends an appropriate pre-written or "canned" response to a customer communication. Exemplary responses may contain general information about the organization, a request for more information from the customer, or a confirmation that the communication was received. A related response module may compose relevant content-rich responses to customer communications using fragments of existing text and retrieved data, with or without the involvement of human agents. For example, an automatic response concerning a customer's account balance may contain a pre-existing text message with the appropriate amount inserted into the message. An automatic response may also be a combination of multiple fragments identified by ME 116. ME 116 analyzes the customer's message to identify intents and/or categories. ME 116 then fetches data, for example an account balance or order status, and a pre-existing text message associated with the appropriate category.

Another module is an Expertise Based Routing (EBR) module 142 that routes a customer communication to the agent or queue best qualified to perform the required task or solve the customer's problem. EBR 142 compares a model of the relationship event (e.g., customer facsimile or wireless communication) with models of all available agents or queues to determine which agent is best suited for responding to the event, and then routes the

event to that agent or queue. An agent's model may include, but is not limited to, the agent's seniority, automatically detected areas of competency, and languages.

Automatic Task Prioritization (ATP) module 141 is another module that is supported by ME 116. ATP 141 prioritizes tasks and learns from feedback and rules which tasks have a higher priority than others. Priority may be determined based on a service level agreement with the particular customer, dollar amounts mentioned in the communication, the type of information being requested by the customer, or other content of a customer communication. ATP 141 may be customized to make priority decisions according to an organization's specifications.

ME 116 also may support a content filter module 143 that filters responses composed by agents. Content filter 143 may be used to avoid emotive or rude replies to customers, and as a method for assessing the quality of the responses. Content filter 143 may also be used to ensure compliance with an organization's regulations. In another embodiment, content filter 143 may filter customer communications for emotive or offensive content, and route these communications to a queue for handling by a senior agent.

Business Process Automation (BPA) modules 145 may be used to complete routine business processes automatically. For example, a transfer of funds between a customer's accounts in a financial institution may be handled automatically, or monthly shipments of a product from a retailer may be processed automatically for customers with standing orders. An automatic

business process may be performed using data retrieved from various sources internal to the organization. Thus, a legacy system and a database having different data structures may exchange data via a BPA module 145 supported by ME 116.

Other modules that may be supported by ME 116 are Workflow Applications (WFA) 144, which allow agents to escalate relationship events, reassign events, or add comments to messages. ME 116 may support other ASMs 146 that an organization may require, such as automatic fetching of data and/or agents needed to solve a particular problem, building a team of skilled agents according to the needs of a task, suggesting internal recipients for a communication within an organization, and detecting "hot prospects."

Another ASM may automatically generate relevant Frequently Asked Questions (FAQ) that are responsive to a customer's intent. The module, in conjunction with ME 116, determines the intent or intents of the customer, selects from a general list the most relevant FAQs, and incorporates them into a response sent to the customer. Yet another module may post an automatic response to a relationship event on a website and send a customized URL to the customer so that, among other things, the system can track if and when the response was accessed.

Another Application Specific Module may generally classify communications and documents based on content. Customer communications that may not require a response, for example responses to customer surveys, and other electronic documents, such as directives from management to

agents, may be classified by content and automatically stored in an appropriate file or database. For instance, this module may identify extremely negative survey responses and forward them to a queue for further evaluation by management.

Other Application Specific Modules that an organization desires may be built and incorporated into an existing system without taking the system off-line. Thus, each system may be customized to meet the needs of a specific organization and may be updated and modified as the organization's needs change.

Referring now to FIG. 3, a flowchart of method steps for processing a relationship event is shown, according to one embodiment of the present invention. In the FIG. 3 embodiment, the new relationship event is received via a text-based channel such as email.

In step 310, system 100 receives a new relationship event, which is translated into a universal data model by contact center 112, and is then routed to ME 116. In step 312, the Natural Language Processor 210 analyzes the event to identify concepts, utilizing linguistic data from Adaptive Knowledge Base 118. NLP 210 may perform various analyses on the event, including semantic, contextual, morphological, and quantitative.

Next, in step 314, the concepts are used to build a model for the event using statistical modeling and modeler 212, as discussed above. In step 316, modeler 212 determines whether it needs further linguistic information for the

event. If so, the method returns to step 312 for additional natural language processing. If not, the method continues with step 318, where ME 116 maps the event model to all models in AKB 118 to determine the relevancy of the event to each category. The event mapping step assigns a score to every category for each relationship event based on how closely the model for the relationship event corresponds to a category's models. The score is determined by comparing the models using the relationship algebra described above. In other embodiments, logical expressions (rules) are used to categorize events. These rules may also be used when models are considered inaccurate.

Next, in step 320, the event is routed for automatic or semi-automatic action, based on the category scores and configuration settings. An event may be routed to certain queues or agents if the corresponding category score is greater than a predetermined threshold. The user (manager) of system 100 may set these thresholds and vary them at any time to best suit the needs of the organization. Alternatively, the threshold values may be set automatically based on information from the system itself.

Relationship events received via a voice channel are processed slightly differently. Voice events may be initially handled by an agent who determines the customer's intent. The agent is presented with a tree showing topics of various customer intents. The agent chooses an appropriate topic or topics, and the system then fetches data and canned responses corresponding to the selected topic.

Voice events may also be processed by a digital signal processing (DSP) module that categorizes events based on the acoustical content of an audio signal. The module compares a received voice event to models of previous events to predict an appropriate action, including transmitting a pre-recorded vocal response. Voice events may be processed in real time, or may be stored as voice mail messages and processed off-line. In the preferred embodiment, the voice events are not transformed into text before being categorized. Agent feedback may be used to refine the models of acoustical patterns.

Referring now to FIG. 4, a diagram of relationship event processing is shown, according to one embodiment of the present invention. A relationship event is received in the contact center 410 and translated into the universal data format. The event is then processed by the Modeling engine (ME) 412 in conjunction with the Adaptive Knowledge Base (AKB), as described above in conjunction with FIGS. 2 and 3. ME 412 accesses any required data from data access services 414 and forwards the event model and data for further processing.

ME 412 may forward the event model and data to an automatic response module 416, an assisted response module 418, or a queue 420. The present invention may also include other modules, as described above in conjunction with FIG. 1. ME 412 may forward the event model to as many modules as needed to respond to all of the intents expressed in the event.

The automatic response module 416 generates an appropriate automatic response and forwards the response to an audit module 424. The audit module 424 may or may not perform an audit on the response, as will be described below. If an audit is performed, the result is then forwarded to a feedback module 426, where feedback is sent to ME 412. This feedback from an automatic response will most likely be positive feedback that strengthens the accuracy rating of the model that selected the response. The automatic response is then sent to the contact center 410, where the response is formatted for the appropriate communication channel and sent to the customer. Feedback module 426 supports multiple feedbacks to a single communication.

The assisted response module 418 will forward the event model, the associated information gathered by ME 412 including a history of interactions with the customer, and a list of suggested (canned) responses to the event to an agent 422. The agent 422 may select one or more of the suggested responses, or may compose an original response. The response is forwarded to the audit module 424, which may or may not perform an audit on the response. The response then flows to the feedback module 426, which provides the response feedback to ME 412.

The feedback system of the present invention performs two separate processes: updates the structure of models in AKB 118 and adjusts the models' accuracy ratings. The feedback from feedback module 426 may be positive or negative. If the agent selected one of the suggested responses, the model that

predicted that response will be updated and its accuracy rating will increase since its feedback was positive. The models that predicted other responses will also be updated, and their accuracy ratings will decrease since their predictions were not implemented, thus their feedback was negative. If the agent composed an original response, some or all of the models will receive negative feedback.

Relationship events and associated data may be sent to one or more queues 420 by ME 412. Queues may store events of low priority until events of high priority have been processed. Other queues may store events that contain more than one request. For instance, a customer may request information regarding an existing account and express an interest in a new account. The first request may be satisfied with an automatic response, but the second request may be sent to a queue for new accounts. The second request may then be forwarded to an agent who handles new accounts.

The present invention includes built-in quality control based on audits of responses to relationship events. The audit module 424 reviews responses to relationship events and feeds this information back to ME 412 via the feedback module 426. ME 412 may determine that a particular agent assisted response was inappropriate if the response varies greatly from what was predicted. The system user may configure the audit module 424 to perform audits based on various criteria, including, but not limited to, the experience level of agents, the status of the customer based on a service level agreement, which queue the

event was routed to, the channel of the event, the type of response, and whether the agent sent a canned or a composed response.

The learning capabilities of ME 116 allow the system to maintain a high level of recall without sacrificing precision. Recall is a ratio of the number of relationship events that are received by the system and the number of events selected for automatic response or automatic action. Precision is a ratio of the number of events selected for automatic response and the number of responses that were correct. In typical systems, when a system is instructed to increase the number of events that will be responded to automatically, the precision of the system decreases noticeably. When recall is increased, the system will select events for automatic response in which the system has lower confidence. This results in a higher potential for errors in selecting appropriate responses, which lowers the system's precision.

In the system of the present invention, ME 116 allows system 100 to automatically respond to a large number of relationship events correctly. ME 116 quickly learns from feedback which responses are appropriate for various intents, and automatically creates new models as new types of relationship events are received. Thus, system 100 may be instructed to increase the number of events selected for automatic response without causing a significant loss of precision.

Loss of precision usually occurs because the "world" a system lives in is continuously changing. A static rule-based or keyword-based system becomes

less accurate over time. In contrast, ME 116 learns and adapts with every relationship event that it sees, thus maintaining a high level of accuracy over time.

The invention has been explained above with reference to a preferred embodiment. Other embodiments will be apparent to those skilled in the art in light of this disclosure. For example, the present invention may readily be implemented using configurations other than those described in the preferred embodiment above. Additionally, the present invention may effectively be used in conjunction with systems other than the one described above as the preferred embodiment. The present invention, which is limited only by the appended claims, is intended to cover these and other variations upon the preferred embodiment.

SYSTEM AND METHOD FOR ELECTRONIC COMMUNICATION MANAGEMENT

ABSTRACT

A system and method for electronic communication management comprises a universal data model, a modeling engine, and an adaptive knowledge base. The modeling engine includes a natural language processor and a statistical modeler. A communication is translated from its native format into the universal data model. The modeling engine determines the intent of the communication using the natural language processor and the statistical modeler. A response is generated, either automatically or by an agent. An audit module analyzes each response and provides feedback to the modeling engine and the adaptive knowledge base. The modeling engine uses the feedback to update models in the adaptive knowledge base. The modeling engine supports various application specific modules.

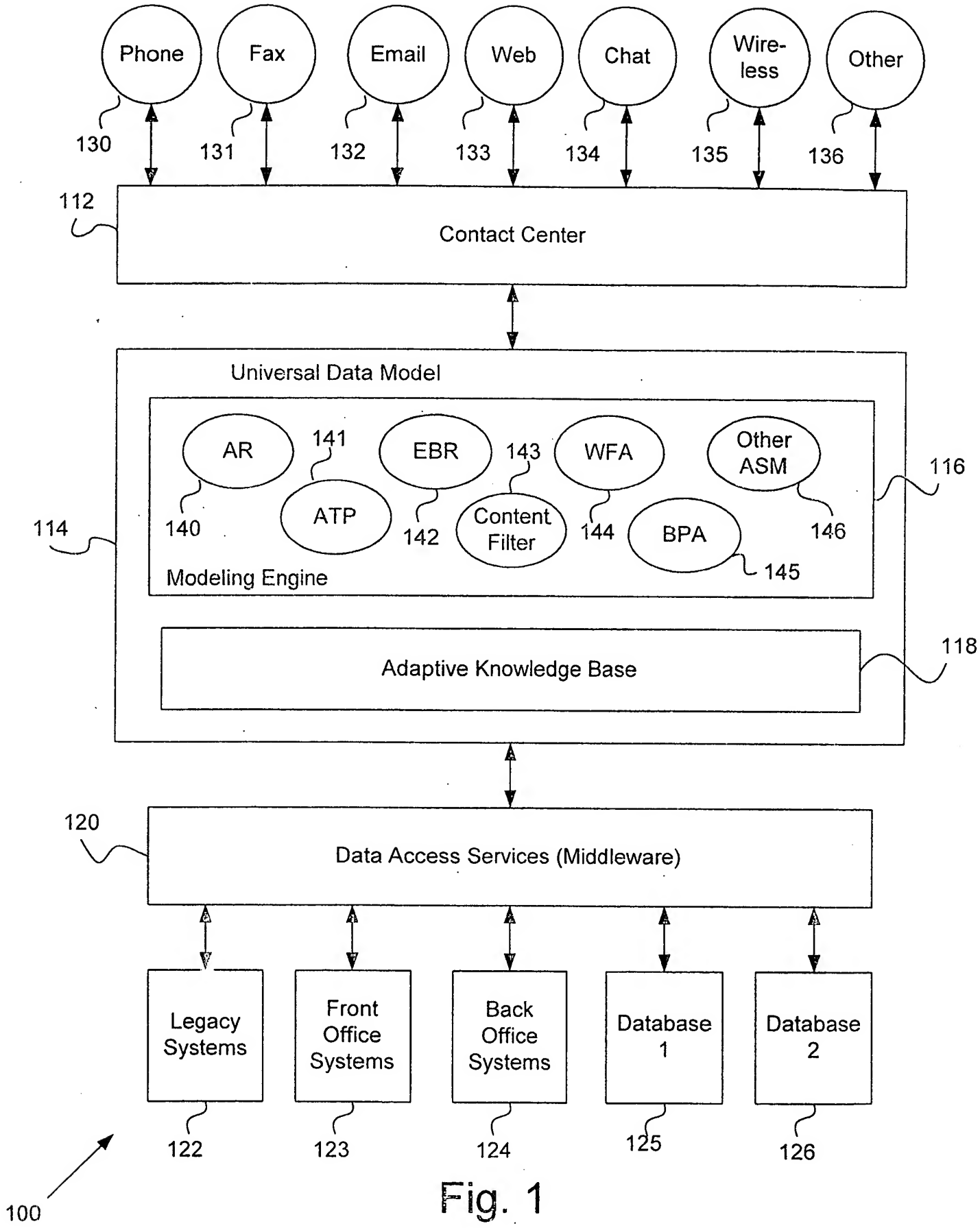

Phone
Fax
Email
Web
Chat
Wire-less
Other
130
131
132
133
134
135
136
112
Contact Center
Universal Data Model
AR
141
EBR
143
WFA
Other ASM
116
ATP
140
142
Content Filter
144
BPA
146
145
114
Modeling Engine
Adaptive Knowledge Base
118
120
Data Access Services (Middleware)
Legacy Systems
Front Office Systems
Back Office Systems
Database 1
Database 2
122
123
124
125
126
100

Fig. 1

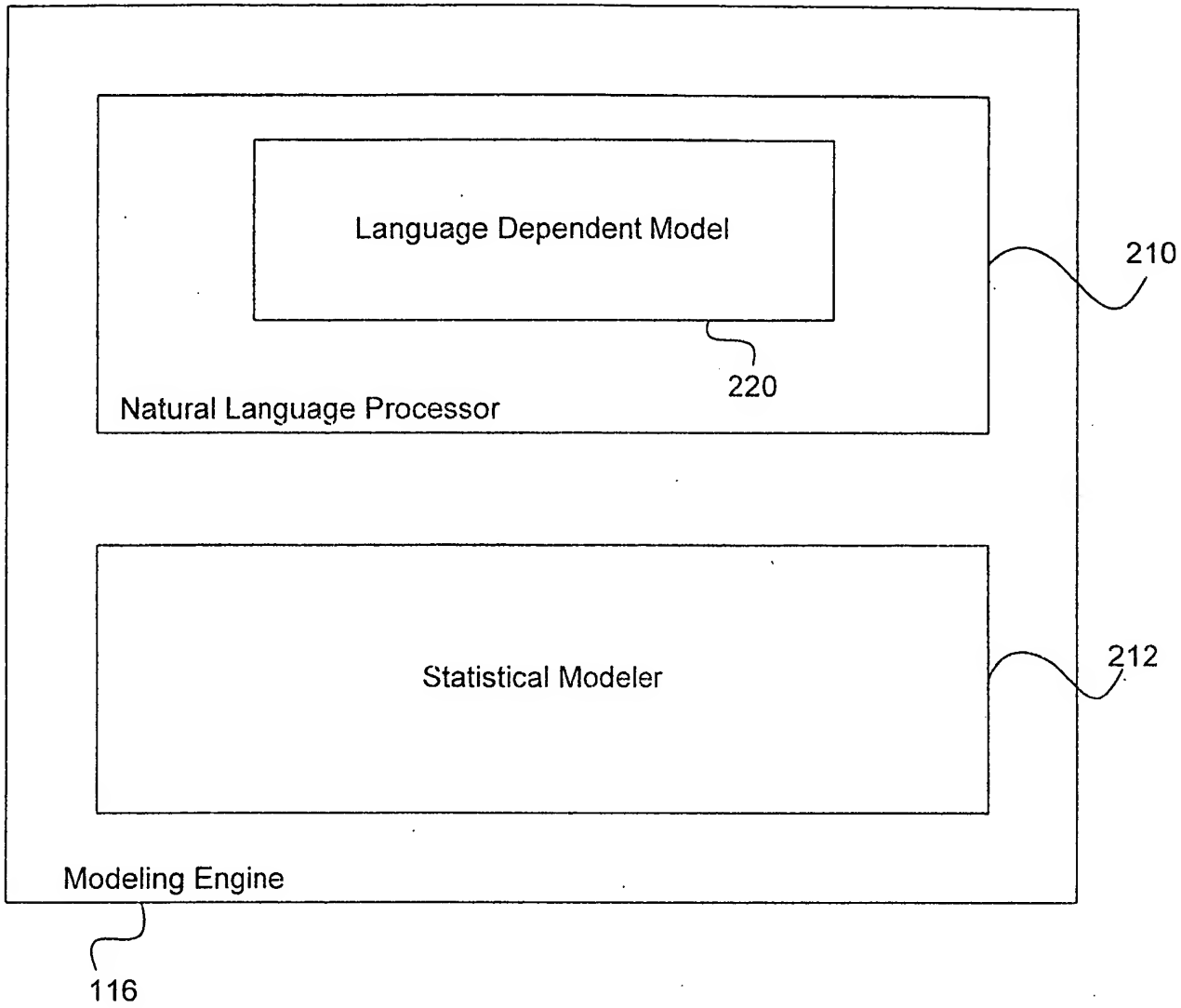

Language Dependent Model
220
Natural Language Processor
210
Statistical Modeler
212
Modeling Engine
116

Fig. 2

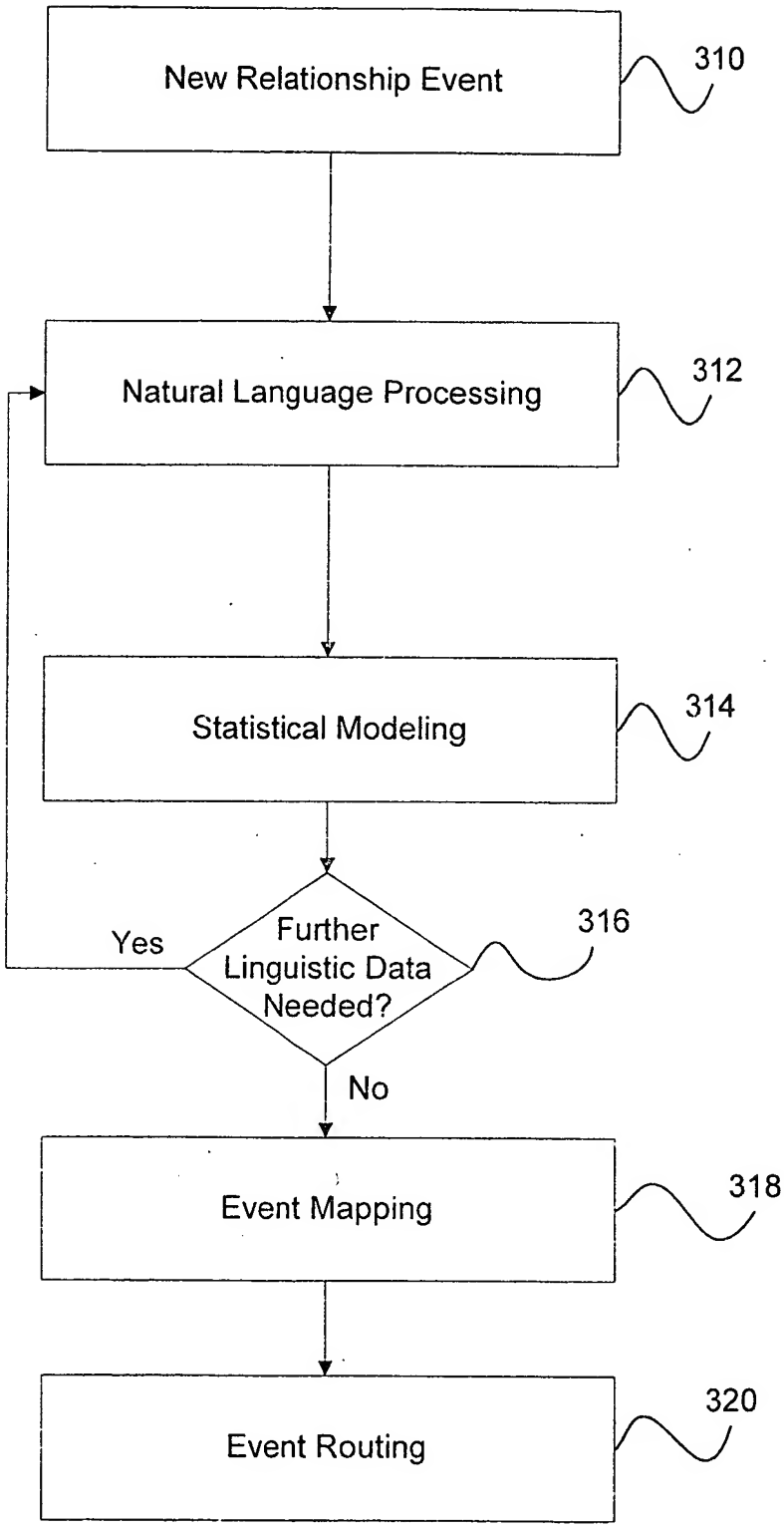

New Relationship Event
310
Natural Language Processing
312
Statistical Modeling
314
Further Linguistic Data Needed?
316
Yes
No
Event Mapping
318
Event Routing
320

Fig. 3

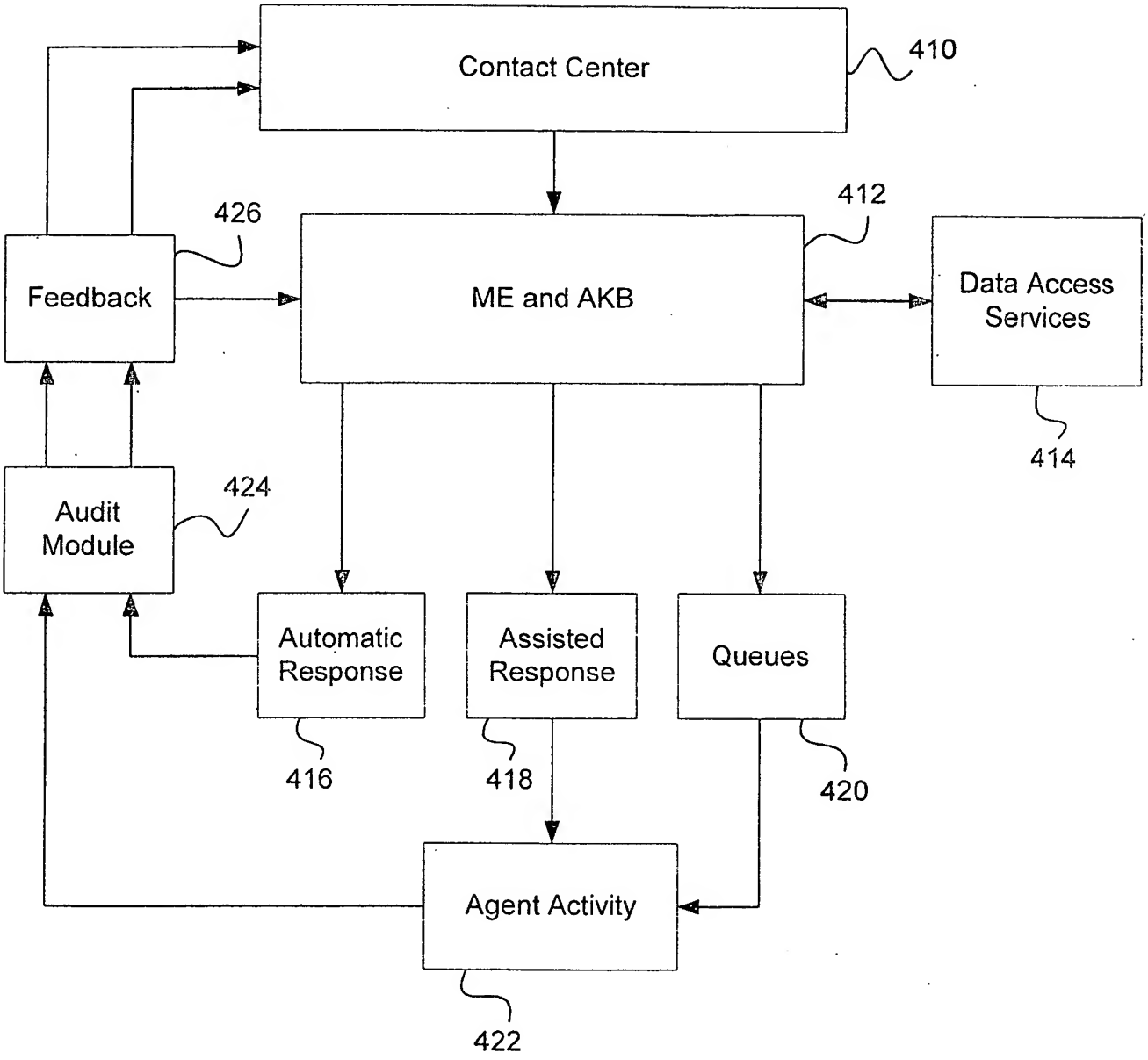

Contact Center
410
426
412
Feedback
ME and AKB
Data Access Services
414
424
Audit Module
Automatic Response
Assisted Response
Queues
416
418
420
Agent Activity
422

Fig. 4

WHAT IS CLAIMED IS:

1. A system for electronic communication management comprising:

a contact center configured to send and receive communications;

a modeling engine configured to analyze received communications and determine an intent of a received communication;

an adaptive knowledge base configured to store models; and

a feedback module configured to analyze responses to the received communications and provide feedback to the modeling engine, which uses the feedback to update the models in the adaptive knowledge base.

2. The system of claim 1, wherein the contact center is configured to send and receive communications via text-based communication channels.

3. The system of claim 1, wherein the contact center is configured to send and receive communications via a voice-based communication channel.

4. The system of claim 1, wherein the contact center is configured to receive text communications containing natural language.

5. The system of claim 4, wherein the modeling engine includes a natural language processor configured to analyze the text communications to identify concepts.

6. The system of claim 5, wherein the natural language processor performs a morphological analysis of the text communications.

7. The system of claim 5, wherein the natural language processor performs a semantic analysis of the text communications.

8. The system of claim 5, wherein the natural language processor includes a lexical knowledge base.

9. The system of claim 1, further comprising an automatic response module that generates the responses to the received communications.

10. The system of claim 1, wherein the responses to the received communications are generated by agents.

11. The system of claim 1, wherein the contact center converts received communications into a universal data model format.

12. The system of claim 1, further comprising an audit module that monitors responses generated by agents for quality.

13. The system of claim 12, wherein the audit module produces an audit result that is fed back to the modeling engine.

14. The system of claim 1, wherein each of the models in the adaptive knowledge base includes an accuracy gauge that is updated by feedback.

15. The system of claim 14, wherein the adaptive knowledge base includes models for active concepts and models for inactive concepts.

16. The system of claim 15, wherein the models for active concepts become inactive when they have a sufficiently low accuracy rating.

17. The system of claim 15, wherein the models for inactive concepts become active when they have a sufficiently high accuracy rating.

18. The system of claim 1, wherein the models in the adaptive knowledge base are organized into categories and the categories are associated with branches.

19. The system of claim 18, wherein the modeling engine modifies the branches in the adaptive knowledge base using the feedback from the feedback module.

20. The system of claim 18, wherein hierarchies of the branches in the adaptive knowledge base are created manually.

21. The system of claim 18, wherein hierarchies of the branches in the adaptive knowledge base are created automatically.

22. The system of claim 18, wherein the branches in the adaptive knowledge base have associated rules.

23. The system of claim 1, wherein the modeling engine includes a statistical modeler that creates the models and performs relationship algebra using the models.

24. The system of claim 1, wherein the modeling engine automatically retrieves data based on the intent of the received communication.

25. The system of claim 24, wherein an automatic response module supported by the modeling engine generates a response to the received communication using the retrieved data.

26. The system of claim 24, wherein an agent composes a response to the received communication using the retrieved data.

27. The system of claim 1, wherein the modeling engine supports an application specific module.

28. The system of claim 27, wherein the application specific module is an automatic response module.

29. The system of claim 27, wherein the application specific module is an expertise routing module.

30. The system of claim 27, wherein the application specific module is an automatic task prioritization module.

31. The system of claim 27, wherein the application specific module is a content filter module that filters content of agent-generated responses.

32. The system of claim 27, wherein the application specific module is a business process automation module.

33. The system of claim 27, wherein the application specific module is a workflow application.

34. The system of claim 27, wherein the application specific module is a Frequently Asked Questions module.

35. The system of claim 27, wherein the application specific module generally classifies the received communications according to content.

36. The system of claim 2, further comprising a digital signal processing module configured to process received voice communications.

37. The system of claim 36, wherein the digital signal processing module categorizes the received voice communications according to acoustical content of the received voice communications.

38. The system of claim 1, wherein the feedback module is further configured to support multiple feedbacks to a single received communication.

39. The system of claim 1, wherein the received communications include documents.

40. The system of claim 39, wherein a statistical matching value between the documents and the models is evaluated by a calculated statistical likelihood value.

41. A method for electronic communication management, comprising the steps of:

receiving a communication;

analyzing the communication to determine an intent;

predicting a response to the communication based on the intent, producing a predicted response;

preparing a response to the communication, producing an actual response; and

comparing the actual response to the predicted response to improve subsequent predictions.

42. The method of claim 41, further comprising the step of routing the communication based on semantical content of the communication.

43. The method of claim 41, wherein the communication is expressed in natural language.

44. The method of claim 41, wherein the step of predicting a response to the communication includes comparing the communication to a model.

45. The method of claim 41, wherein the step of preparing a response is performed by an automatic response module.

46. The method of claim 41, wherein the step of preparing a response is performed by an agent.

47. The method of claim 41, wherein the communication is a text communication containing natural language.

48. The method of claim 47, wherein the step of analyzing the communication includes morphological analysis and semantic analysis.

49. The method of claim 41, wherein the step of predicting a response to the communication includes comparing the communication to a set of models that corresponds to a category related to the intent.

50. The method of claim 41, wherein the step of comparing the actual response and the predicted response produces feedback that is used to modify a model.

51. The method of claim 50, where if the actual response is substantially the same as the predicted response, the feedback is positive, and if the actual response is substantially different from the predicted response, the feedback is negative.

52. The method of claim 41, wherein the communication is a voice communication expressed in natural language.

53. The method of claim 52, wherein the step of analyzing the communication includes digital signal processing of the voice communication.

54. The method of claim 53, wherein the step of predicting a response to the communication includes categorizing the voice communication based on acoustical content of the voice communication.

55. A method for processing a relationship event, comprising the steps of:

receiving the relationship event;

analyzing the relationship event to identify concepts in the relationship event;

building an event model of the relationship event using the concepts;

mapping the event model to models in a knowledge base to produce category scores; and

routing the relationship event for action based on the category scores.

56. A computer-readable medium having embodied thereon a program, the program being executable by a computer to perform method steps for electronic communication management, the method steps comprising:

receiving a communication;

analyzing the communication to determine intent;

predicting a response to the communication based on the intent, producing a predicted response;

preparing a response to the communication, producing an actual response; and

comparing the actual response and the predicted response to improve subsequent predictions.

57. The computer-readable medium of claim 56, wherein the step of comparing the actual response and the predicted response occurs in real time.

58. The computer-readable medium of claim 56, wherein the step of comparing the actual response and the predicted response occurs off-line.

59. A computer-readable medium having embodied thereon a program, the program being executable by a computer to perform method steps for processing a relationship event, the method steps comprising:

receiving the relationship event;

analyzing the relationship event to identify concepts in the relationship event;

building an event model of the relationship event using the concepts;

mapping the event model to models in a knowledge base to produce category scores; and

routing the relationship event for action based on the category scores.

60. A system for electronic communication management, comprising:

means for receiving a communication;

means for analyzing the communication to determine intent;

means for predicting a response to the communication based on the intent, producing a predicted response;

means for preparing a response to the communication, producing an actual response; and

means for comparing the actual response and the predicted response to improve subsequent predictions.

61. A system for electronic communication management, comprising:

a contact center configured to send and receive communications via communication channels including telephone, facsimile, electronic mail, web forms, chat, and wireless;

a modeling engine configured to analyze a received communication to determine an intent, and further configured to retrieve data related to the intent;

an adaptive knowledge base configured to store models; and

a feedback module that compares a response predicted by the modeling engine in conjunction with the models in the adaptive knowledge base and an actual response to the received communication to generate feedback, the feedback being used to update the models in the adaptive knowledge base such that the system learns from each received communication.

62. The system of claim 61, wherein the modeling engine gains knowledge from communications on one communication channel and applies the knowledge to communications on another communication channel.

Please add new claims 63-82:

63. A method comprising the steps of:

receiving a communication;

analyzing content of the communication to identify at least one concept of the communication;

creating a model of the communication using the at least one concept;

comparing the model of the communication to a set of adaptive models to produce a predicted response to the communication;

preparing an actual response to the communication;

comparing the predicted response and the actual response to produce feedback; and

using the feedback to modify at least one of the set of adaptive models such that the set of adaptive models learns with each received communication.

64. The method of claim 63, wherein the step of comparing the predicted response and the actual response occurs in real time.

65. The method of claim 63, wherein the step of using the feedback to modify at least one of the set of adaptive models occurs in real time.

66. The method of claim 63, wherein the step of comparing the predicted response and the actual response occurs while further communications are being received.

67. The method of claim 63, wherein the step of using the feedback to modify at least one of the set of adaptive models occurs while further communications are being received.

68. The method of claim 63, wherein the content of the communication is expressed in a natural language.

69. The method of claim 63, wherein the content of the communication includes natural language and metadata.

70. The method of claim 63, wherein the content of the communication includes natural language and structured information.

71. The method of claim 63, wherein the communication is a text communication.

72. The method of claim 63, wherein the communication is a voice communication.

73. A system for electronic communication management, comprising:

a contact center configured to send and receive communications;

an adaptive knowledge base configured to store models;

a modeling engine configured to analyze a received communication to determine an intent, to prepare a model of the communication based on the intent, and to compare the model of the communication with the models stored in the adaptive knowledge base to produce a predicted response; and

a feedback module configured to compare the predicted response with an actual response to the received communication to generate feedback used by the adaptive knowledge base to modify at least one model such that the system learns from the received communication.

74. The system of claim 73, wherein a human agent produces the actual response to the received communication.

75. The system of claim 73, wherein the adaptive knowledge base modifies at least one model in response to each communication received by the contact center such that the system learns from each received communication.

76. The system of claim 73, wherein the modeling engine is further configured to determine a plurality of intents in the received communication.

77. The system of claim 76, wherein the modeling engine is further configured to determine an explicit intent and an implicit intent in the received communication.

78. A method for real-time learning, comprising the steps of:

receiving a communication;

creating a model of the communication;

comparing the model of the communication to a set of adaptive models to produce a predicted action in response to the communication;

comparing the predicted action with an actual action in response to the communication to produce feedback; and

updating the set of adaptive models according to the feedback.

79. The method of claim 78, wherein if the predicted action substantially matches the actual action, the feedback is positive and an accuracy rating of a model in the set of adaptive models that produced the predicted action is increased.

80. The method of claim 78, wherein if the predicted action substantially differs from the actual action, the feedback is negative and an accuracy rating of a model in the set of adaptive models that produced the predicted action is decreased.

81. The method of claim 78, wherein if the predicted action substantially differs from the actual action and if a model that substantially matches the actual action exists in the set of adaptive models, then the feedback is negative for a model in the set of adaptive models that produced the predicted action and the feedback is positive for the model that substantially matches the actual action.

82. A method for real-time learning, comprising the steps of:

receiving a communication;

creating a model of the communication;

comparing the model of the communication to a set of adaptive models to determine a category for the communication;

comparing the determined category with an actual category for the communication to produce feedback; and

updating the set of adaptive models according to the feedback.